

Original investigation

Prevalence and Correlates of Tobacco and Nicotine Containing Product Use in a Sample of United States Air Force Trainees

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Abstract

Introduction: Although there is increasing attention to the prevalence of new and emerging tobacco products in the civilian population, remarkably little is known about the current prevalence of these products in a military population.

Methods: The current investigation was designed to determine the prevalence of tobacco and nicotine containing products (TNCP) and correlates of use across multiple cohorts of trainees undergoing Technical Training in the US Air Force between April 2013 and December 2014. Chi-square test, Cochran–Armitage test for linear trend, and logistic regression models were applied to test differences and linear trends across time for TNCP use as well as correlates of use in a cross-sectional sample of 13 685 Airmen (final analytic sample).

Results: Over a quarter (26.9%) of Airmen reported regular use of a TNCP. The two most prevalent products were cigarettes (11.2%) and hookah (10.5%). Among correlates of use, Airmen that regularly use TNCPs were more likely to be male, younger, non-Hispanic white, and single with a high school degree or General Education Development. Hookah was the most endorsed for intentions to use, and along with e-cigarettes, had the lowest perception of harm. While prevalence of most products remained constant across entering cohorts, the prevalence of e-cigarettes showed significant linear increase.

Conclusions: The prevalence of TNCP use is high across cohorts of Airmen. Remarkably high estimates of future intentions to use and low perceptions of harm for emerging products suggest that intervention efforts should be directed at multiple forms of TNCP use to address this important public health issue.

Introduction

Tobacco has been the leading cause of preventable death in the United States for over 50 years and is responsible for nearly half a million deaths annually.¹ Although cigarette smoking remains the most commonly used tobacco and nicotine containing product (TNCP) in the

United States (18% of all adults are current smokers),^{2,3} other TNCPs are becoming increasingly popular. Recent data suggest that hookah (also referred to as a waterpipe, shisha, narghile, kальяn, and hubble-bubble) use among US college students ranges from 22% to 40%.^{4–7} Findings from the National Adult Tobacco Survey show that across all age groups, 21.3% of US adults reported current use of a TNCP.²

Similar to new and emerging tobacco products, the prevalence of electronic cigarette (“e-cigarettes”) use has quadrupled among adults in the United States between 2009 (0.6%) to 2010 (2.7%),⁸ and doubled among high school students in the United States from 2011 (4.7%) to 2012 (10.0%).⁹ While the research regarding the safety and efficacy of e-cigarettes as cessation aids remains in early stages, it is clear that these products are gaining popularity regardless of what long-term effects eventually demonstrate.

Although there is increasing attention to the prevalence of new and emerging products in the civilian population, remarkably little is known about the current prevalence of these products in military populations. Previous research has suggested that military personnel have among the highest prevalence of TNCP use in the United States. According to a report published by the Department of Defense in 2013, among all military personnel, 24% reported current cigarette smoking.¹⁰ These prevalence estimates are higher than comparison civilian samples that average current cigarettes smoking closer to 18%.² Prevalence estimates of smokeless tobacco are also high among active duty military relative to the civilian population; 12.8% of active duty military personnel report current smokeless tobacco use compared to 2.6% of adults in the United States.^{2,10}

Despite these broad estimates of TNCP use among those in active military duty, relatively little is known about TNCP use prior to enlistment, including the prevalence of new and emerging TNCP products. These omissions in the literature are notable, as approximately 15% of active duty military personnel are believed to initiate cigarette smoking after enlistment into the military,¹¹ suggesting that those who do not use TNCPs prior to enlistment have a high susceptibility upon entry. High initiation levels of TNCPs may be due to demographic (mostly male, low income) and psychosocial (risk taking, high alcohol consumption) risk factors that are prevalent among military personnel.^{10,12,13} Additionally, several environmental factors, such as tobacco industry promotional efforts, the availability of low cost tobacco products in military exchanges and commissaries, and the high stress deployment environment, are other likely contributors to these high levels of initiation.^{10,14}

Although the military represents a specific population of interest, the public health implications of TNCP use in the military is considerable; the US military is the nation’s largest employer, employing approximately 1.4 million active duty personnel and over 700 000 civilian personnel.¹⁵ Each year the Department of Defense spends on average \$1.6 billion treating tobacco-related morbidity among active duty military personnel (eg, medical care, hospitalizations, lost work days). Given that approximately 250 000 individuals leave the military each year, many continuing their tobacco dependence into their civilian lives, current data on the prevalence of TNCPs and opportunities for interventions in individuals enlisting into military service is needed to inform policy and future research.

While prevalence rates are important data for determining who is using TNCPs, there are other individual factors that may provide important information regarding additional future risk. This is necessary information when the population is known to be at incremental risk for use in the future, such as military trainees, a large portion of whom begin use after enlistment.² Two factors, (1) intentions to use in the future and (2) low perceived harm associated with TNCP use, have been found to be significant correlates of current use and predictors of future use in multiple studies.^{6,7,16–19}

Intentions to use in the future have been found to be reliable predictors of future use according to the Theory of Planned Behavior.²⁰

To date, multiple studies have found that intentions to use cigarettes predict initiation of use or escalation of use in adolescents,^{16,17,21,22} predicting use up to 3 years after assessment, suggesting that intentions are a resilient factor in determining future risk. In addition, disproportionate estimates of harm resulting from tobacco products have been found repeatedly between cigarette smokers and nonsmokers, with smokers estimating significantly lower harm^{19,23} suggesting a well-established link between these cognitions and behavior. Importantly, these misperceptions also appear to be associated with the use of new and emerging products, such as hookah, which may be promoting escalating prevalence of use.^{18,19} Taken together, these factors appear to be important information for understanding a population at imminent risk for TNCP initiation or escalation of use.

The purpose of the current study is to determine the prevalence and correlates of TNCPs, including cigarettes, new and emerging tobacco products, and e-cigarettes, in young military trainees. In addition, we assessed two important correlates of use, including intentions to use and perceptions of harm associated with TNCPs to assist future work in identifying areas for intervention. In the US Air Force all recruits first go to Lackland Air Force Base (AFB) in San Antonio, TX for 8 ½ weeks of basic military training (BMT). During this period of time, recruits are alcohol and TNCP free and the constraints of their training makes it impossible to violate this restriction. After BMT, recruits become Airmen (called Airmen regardless of gender or rank) and are sent to Technical Training where they learn the skills for their designated job in the Air Force (eg, helicopter repair, nuclear weapons training). During the first 2 weeks of Technical Training, recruits are required to maintain the restriction on alcohol and TNCPs. Capitalizing on this protracted restriction could be an opportune time for tobacco prevention interventions. However, developing effective TNCP interventions for this unique situation necessitates a deeper understanding of the current prevalence and correlates of TNCPs among military Airmen prior to enlistment. This study will report the prevalence of TNCP use in a cross-sectional sample of 13 685 Airmen undergoing Technical Training between 2013 and 2014.

Methods

Participants and Procedure

Participants were US Air Force Airmen being trained at the four advanced major Technical Training AFBs in San Antonio, TX (Lackland AFB and Fort Sam Houston), Biloxi, MS (Keesler AFB), or Wichita Falls, TX (Sheppard AFB) in 2013 and the first quarter of 2014. Over 75% of Airmen attending Technical Training at that time were trained at one of these three AFBs. During Technical Training, regardless of the site, Airmen received a brief binge and problem drinking intervention.²⁴ Following the intervention, Airmen received information about the current study which aims to evaluate TNCP onset and cessation in a cohort of military personnel. Airmen were encouraged to ask questions and were required to sign informed consent forms if they were willing to participate. The consent rate across all Technical Training facilities for the assessment period was 70.4%. The current study utilized cross-sectional data from the baseline questionnaire. This protocol was approved by the Institutional Review Boards at Wilford Hall Ambulatory Surgical Center and the University of Tennessee Health Science Center.

Measures

Because the Airmen were still alcohol, tobacco, and nicotine free when surveyed, the baseline questionnaire assessed tobacco and e-cigarette use prior to BMT. The questionnaire assessed three domains: (1) demographics (ie, age, gender, education, race, ethnicity, and marital status), (2) prevalence of TNCPs, and (3) endorsement of common correlates of tobacco and e-cigarette use. Prevalence and correlate items are described below.

Prevalence of Tobacco and E-cigarette Use

The prevalence of TNCP use was assessed by asking participants how often they used the following products prior to enlistment: cigarettes, smokeless tobacco (chewing tobacco), snus, cigars, cigarillos (little cigars, eg, Black & Mild, Swisher Sweet, White Owl), pipe, electronic cigarettes, hookah (waterpipe, shisha, narghile, kальяn, and hubble-bubble), roll your own cigarettes, and compressed tobacco²⁵ in the form of orbs, sticks and strips. Response categories ranged from “Never,” “Quit prior to BMT,” “Less than monthly,” “Monthly,” “Weekly,” to “Daily.” If the participant indicated daily use, she/he was asked how many times a day they used the product. Regular use of a TNCP was defined as at least monthly use of the product, as this is a common definition of regular TNCP use in young adults.^{26,27} Participants who reported never using any of the 10 TNCPs, using TNCPs less than monthly and had quit prior to BMT were considered non users. Because only two Airmen reported using orbs, sticks and strips, and these products have been subsequently removed from test marketing, compressed tobacco products were not included in the data analysis for the current study.

Correlates of Tobacco and E-cigarette Use

Correlates of tobacco use that were assessed included intentions to use and perceived harm. To assess tobacco use intentions, Airmen were asked how confident they were that they would not be using any TNCPs a year from now (ranging from: 1 = “Completely confident” to 5 = “Not at all confident”). In addition, Airmen were asked to indicate whether they were planning on using specific TNCP products from a list of 10 TNCPs (yes, I plan to use, no I do not plan to use). Perceived harm was assessed by asking Airmen how harmful they thought each TNCP was on a 7-point Likert scale (with anchors of 1 = “Not harmful”, 4 = “Moderately harmful”, to 7 = “Extremely harmful”).

Statistical Analysis

Descriptive statistics of key demographic variables were computed for the overall study population and separately by each TNCP. Differences in proportions of demographic variables across TNCPs were calculated using chi-square tests. Changes in prevalence and linear trends of TNCPs over time were calculated using chi-square tests and Cochran–Armitage test for trend. Significant historical linear trends were confirmed with a logistic regression model adjusting for demographic variables (including gender, age, race/ethnicity, education, and marital status).

Time intervals for historical linear trend analysis were divided into seven recruitment cohorts recruited in the following periods: (Q1) April 2013 to June 2013 ($N = 1222$), (Q2) July 2013 to September 2013 ($N = 2259$), (Q3) October 2013 to December 2013 ($N = 3601$), (Q4) January 2014 to March 2014 ($N = 3403$), (Q5) April 2014 to June 2014 ($N = 2196$), (Q6) July 2014 to September 2014 ($N = 405$), and (Q7) October 2014 to December 2014

($N = 599$). T test and chi-square tests were used to assess differences in intentions to use TNCPs and perceived harm among users and nonusers of TNCPs for each cohort. We applied a multivariate logistic regression model for each product including all demographics (gender, age, race/ethnicity, education, and marital status) as independent variables. These models were then expanded by adding perceived harm of, and intentions to use that particular product. Associations were considered significant at the alpha level of 0.05. Data were analyzed using SAS version 9.4 (SAS Institute, Cary, NC).

Results

The final analytic sample included 13 685 Airmen with complete data on the baseline survey with respect to TNCP use and demographics. Participants were predominantly male (78.2%), less than 21 years old ($mean = 20.5$, $SD = 2.9$), single (89.4%), and a little less than half had some college education (43.1%). Sixteen percent of Airmen reported being Hispanic and 61.3% reported being non-Hispanic white. A chi-square test revealed that participants excluded from the analyses due to missing TNCP and demographic items ($N = 755$) compared with those included in the analytic sample ($N = 13 685$), were significantly more likely to be of Hispanic descent (15.4% vs. 2.9% non-Hispanic white; 3.8% non-Hispanic black; 4.0% non-Hispanic Asian; 3.5% non-Hispanic other; and 2.7% non-Hispanic more than one race, respectively; $P < .0001$), respectively. No other significant differences were observed on key TNCPs and demographic variables between these two samples.

TNCP Prevalence

Over a quarter ($N = 3679$, 26.9%) of the Airmen reported regular use of a TNCP (Table 1). Cigarettes were the most prevalent TNCP used by Airmen (11.2%), followed by hookah (10.5%), cigarillos (8.7%), and smokeless tobacco (8.5%). Roll your own cigarettes and pipe use were the least used TNCPs (1.1% and 1.2%, respectively). Almost 6% of the total sample reported using e-cigarettes. Airmen that regularly use TNCPs were more likely to be male, non-Hispanic white, and single with a high school degree or General Education Development.

Correlates of Use

Intentions to Use

Almost two-thirds (63.0%) of Airmen were “completely confident” they would remain TNCP free 1 year later, while 25.5% ranged between “neutral” and “not confident at all.” Current TNCP users were more likely to report intentions to use TNCPs in the future. Intentions to use hookah were the highest endorsed TNCP across TNCP users and nonusers (38.9% and 7.1%, respectively). Among current TNCP users, 29.1% reported intentions to use smokeless tobacco, followed by 26.5% to use cigarettes, 25.6% cigars, and 21.2% e-cigarettes. Among non-TNCP users, 5.1% reported intentions to use cigars, 3.2% reported intentions to use cigarillos and 2.1% intentions to use e-cigarettes.

Perceived Harm

Perceived harm across all TNCPs were higher for nonusers compared with users (all $P < .0001$). Effect sizes ranged from 0.30 for roll your own cigarettes to 0.70 for snus. Perceived harm was lowest for e-cigarettes (users: $mean = 3.3$, $SD = 1.9$, nonusers: $mean = 4.5$, $SD = 1.9$) and hookah (users: $mean = 3.9$, $SD = 1.9$, nonusers:

Table 1. Tobacco and Nicotine Containing Product Prevalence by Demographic Characteristics (N = 13 685)

	Cigarettes		Smokeless tobacco		Snus		Cigars, premium		Cigarillos		Pipe		Roll your own cigarettes		Hookah		E-cigarettes		Any tobacco product user	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Gender																				
Female	294	9.9	26	0.9*	27	0.9*	17	0.6*	150	5.0*	3	0.1*	18	0.6*	316	10.6	115	3.9*	585	19.6*
Male	1233	11.5*	1142	10.7	255	2.4	643	6.0	1038	9.7	166	1.6	134	1.3	1119	10.5	694	6.5	3094	28.9
Age ^a	20.4 (2.6)		19.9 (2.1)		19.5 (1.9)		19.7 (2.1)		19.5 (1.7)		20.0 (2.3)		20.4 (2.1)		19.7 (1.8)		19.8 (2.2)		20.1 (2.3)	
Race/ethnicity																				
Non-Hispanic white	1113	13.3*	1014	12.1*	229	2.7*	532	6.3*	798	9.5*	140	1.7*	120	1.4*	868	10.4*	556	6.6*	2603	31.0*
Non-Hispanic black	95	5.3	17	0.9	5	0.3	24	1.3	160	8.9	6	0.3	10	0.6	134	7.4	40	2.2	287	15.9
Hispanic	183	8.4	74	3.4	24	1.1	65	3.0	138	6.3	14	0.6	10	0.5	282	13.0	115	5.3	470	21.6
Non-Hispanic Asian	37	8.6	7	1.6	1	0.2	6	1.4	8	1.9	1	0.2	1	0.2	33	7.7	26	6.1	64	15.0
Non-Hispanic other	40	11.3	32	9.0	12	3.4	20	5.6	40	11.3	5	1.4	6	1.7	49	13.8	34	9.6	109	30.7
Non-Hispanic more than one race	59	11.0	24	4.5	11	2.1	13	2.4	44	8.2	3	0.6	5	0.9	69	12.9	38	7.1	132	24.7
Education																				
High school or GED	921	11.8*	754	9.7*	205	2.6*	431	5.5*	822	10.6*	110	1.4*	94	1.2	888	11.4*	543	7.0*	2262	29.1*
Some college	606	10.3	414	7.0	77	1.3	229	3.9	366	6.2	59	1.0	58	1.0	547	9.3	266	4.5	1417	24.0
Marital status																				
Single	1372	11.2	1078	8.8*	255	2.1	615	5.0*	1120	9.2*	160	1.3*	141	1.2	1351	11.0*	737	6.0	3377	27.6*
Married/living with partner	155	10.7	90	6.2	27	1.9	45	3.1	68	4.7	9	0.6	11	0.8	84	5.8	72	5.0	302	20.8
Total	1527	11.2	1168	8.5	282	2.1	660	4.8	1188	8.7	169	1.2	152	1.1	1435	10.5	809	5.9	3679	26.9

Note. GED = General Education Development. Differences in proportions of demographic variables across tobacco product were calculated using chi-square test.

^aFor age only, mean (SD) presented in the table.

* $P < .05$.

mean = 4.8, $SD = 1.9$), and highest for cigarettes (users: mean = 6.1, $SD = 1.2$, nonusers: mean = 6.5, $SD = 0.9$) and roll your own cigarettes (users: mean = 5.8, $SD = 1.4$, nonusers: mean = 6.2, $SD = 1.3$).

Multivariate Regression Models

In general the results of the multivariate logistic regression models support the associations presented in Table 1 between demographic correlates and TNCP use. For all products except pipe, roll your own cigarettes and cigarettes, age was inversely associated with increasing use (all $P < .05$). After adjusting for demographics, perceived harm of, and intentions to use that specific product were highly associated with current use of that same product (all $P < .0001$).

Trends Across Cohorts Over Time

Figure 1 presents the prevalence of TNCPs for each new class trained over 21 months starting in April of 2013 through December of 2014. New trainee classes are engaged approximately every 3 months, resulting in seven individual cohorts across this period. While the prevalence of most products remained constant across each cohort, the prevalence of e-cigarettes showed significant linear increase (Cochran–Armitage test, $\chi^2 = 67.2$; $df = 1$; $P < .0001$) across classes engaged from April 2013 to December 2014, from 3% to 10.5%. After the adjustment for demographic variables, significant odds ratios started in Q3 and ranged between 1.8 to a high point of 3.4 (95% CI = 2.2% to 5.2%; $P < .0001$) in Q7. Thus, e-cigarette odds of use more than tripled in a 21-month period of time, even after adjusting for demographic variables.

Discussion

This study presents current estimates of prevalence of TNCPs prior to enlistment into training for the US Air Force. Across all TNCPs, results of the current study indicate that TNCP use among incoming Airmen is quite prevalent, with over a quarter of Airmen reporting regular use of a TNCP. Compared with current estimates from

civilian populations of corresponding age and gender,²⁸ our findings suggest higher TNCP use among Airmen entering the military; the prevalence of TNCPs were, on average, approximately two times more prevalent in our sample.

This is the first study to document the use of both traditional and new and emerging TNCPs in a high risk population of military Airmen. Contrary to current estimates in civilians,²⁸ cigarette use was the only TNCP that was lower (11.2%) than the national average (18%) for this age group.³ Although cigarettes remained the most commonly used TNCP, the prevalence of hookah, cigarillos, and smokeless tobacco were also quite high. Interestingly, while sex differences were demonstrated across most TNCPs (with men reporting higher prevalence), we observed no sex differences with respect to hookah use. This finding is similar to national trends,²⁸ although our prevalence estimates are 10 times higher than the national average and four times higher than young adults aged 18–24. It should be noted that our definition of use may be overly inclusive compared to some national samples. It is common for definitions of current use among samples of adult smokers to utilize the qualifier of smoking at least 100 cigarettes in one's lifetime. We did not include this qualifier, as it has been found to underestimate use in samples of youth and young adults,²⁶ which constitute the majority of our sample. However, this potential bias must be considered when making comparisons of our results with national data.

Regarding correlates of use, intentions to use hookah were higher than any other TNCP across all Airmen. These findings are particularly troublesome, given that hookah smoke contains many of the same toxicants thought to lead to cancer, heart disease, and addiction in cigarette smokers.²⁹ In fact, hookah use may be linked with even greater toxicant exposure due to the patterns of use (eg, larger puffs, longer smoking episodes). The high intentions to use in this sample suggest that young Airmen may not understand the risks involved with multiple forms of tobacco use. Among current TNCP users, intentions to use hookah was nearly 40%, with intentions to use smokeless tobacco, cigarettes, and cigars not far behind. Compounding these alarming levels of intention to use, results from

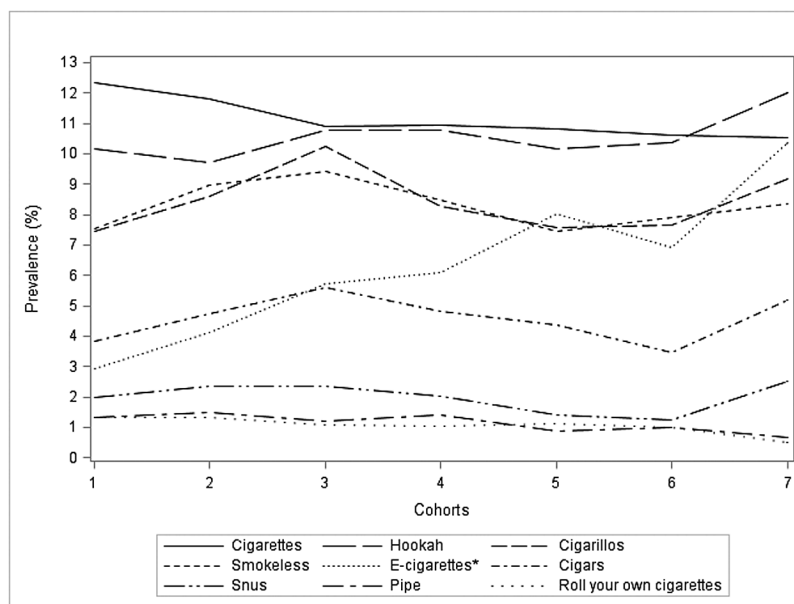


Figure 1. Tobacco and nicotine containing products prevalence over time ($N = 13\,685$). Trend lines are sorted from highest in prevalence (cigarettes) to lowest (roll your own), in accordance with the legend. * $P < .0001$; Cochran–Armitage test for trend.

perceived harm data are additional cause for concern. The perceived harm scale ranged from 1 = "Not harmful" to 7 = "Extremely harmful." Results suggest that although Airmen tend to view cigarettes at a 6.1, nearing the highest category of "extremely harmful," hookah did not even reach the halfway mark on the perceived harm scale at a 3.9. This suggests that Airmen may be unaware of the health risks associated with smoking new and emerging TNCPs (eg, hookah), which they may perceive as safe (or safer) alternatives to cigarettes.⁶ Perhaps even more interesting is that hookah use was equivalent in harm estimates to e-cigarette use, suggesting that Airmen are grossly underestimating the harm associated with hookah use.

Historical trends suggested that while the prevalence of most TNCPs remained constant across each entering cohort, the prevalence of e-cigarettes showed significant linear increase, from 3% to 10.5%. This rapid escalation in use suggests that attention should be paid to these rising levels of use; although research suggests that e-cigarettes may be less harmful than traditional tobacco products,^{30,31} it is unclear whether the use of e-cigarettes represents a replacement for other products, or an additional product to use. In a previous study of military Airmen,³² we found that e-cigarette use was associated with increased odds of use for all measured TNCPs, as well as dual and poly use (all $P < .0001$). Although additional work is needed to disentangle the reasons for increasing e-cigarette use among military recruits, these results are a necessary first step in understanding the prevalence of these new and emerging tobacco products in military populations in order to inform future intervention development.

Implications

The current work examines TNCP use prior to enlistment in the US Air Force. It is important to note that those reporting were newly enlisted Airmen who only recently left the civilian sector and who were tobacco and nicotine free at the time of assessment. These prevalence estimates therefore represent the TNCP issues "inherited" by the Air Force, not a product of it. On a related note, it is clear that cigarette smoking prevalence in this sample are low (11.2%), but when taken in context that these represent the prevalence prior to military experience, low estimates seem more reasonable. If prior work is correct and 15% of active duty military personnel initiate cigarette smoking after enlistment into the military,¹¹ inherited TNCP users and new initiates together represent normative prevalence estimates.

These results have strong implications for both prevention/intervention and policy work. For those who have not yet begun use, prevention programs at the time of enlistment may inhibit many from initiating use in the military environment. For who have begun use prior to enlistment, the universal bans on tobacco, nicotine and alcohol during BMT represents a time to teach intervention skills to assist individuals in remaining TNCP free after the bans are lifted and freedom to use is resumed.^{33,34} It should be noted that all service branches of the military have tobacco bans during BMT so this represents a teachable moment for a large number of at risk young adults.

Regarding policy work, the current study assists in informing appropriate rules military-wide. For instance, the Department of Defense was considering banning tobacco sales from all military installations and ships,³⁵ a move that would have eliminated easy access to low cost TNCPs.³⁶ Although Congress did not approve banning tobacco sales altogether, they did authorize removing the 5% price difference of TNCPs offered at most military exchanges.³⁷ In addition, the Air Force has recently made policies governing

e-cigarette use; according to published regulations from 2014, the Air Force Instruction 40-102, Tobacco Use, "...establishes tobacco policy in the Air Force and explicitly includes e-cigarettes under the definition of tobacco, subjecting the product to all the restrictions implemented for cigarettes, cigars, and smokeless tobacco. The Air Force is the first service to establish an e-cigarette policy."³⁸ Information regarding inherited TNCP use in Airmen provides valuable information for interventionists and policy-makers alike to use important periods of training to curb rising issues.

Limitations and Future Directions

Strengths of the current study include a large sample size in a military population with timely data. The current study is the first to document the prevalence of new and emerging TNCPs in the US military. However, our study is limited by our sample being Airmen and may not be representative of other service branches. While the Air Force is the second largest service branch (behind the Army), future studies should extend assessments to the Army, Navy, and Marines. In addition, we relied on self-reports of tobacco and nicotine status. While there is evidence that self-reported substance use data is quite reliable for up to 5 years in retrospective assessments,³⁹ other, less subjective methods of assessments may be useful to confirm results.

Another limitation to the current study is the differences in sample sizes of the recruitment classes. Sample sizes in Q6 and Q7 were lower than earlier reported quarters. Originally, we approached all Airmen to participate in our study. However, we slowed our recruitment in order to meet and not exceed our target sample size goal for the study within the proposed timeline. Despite that, samples in these two quarters are still large enough to estimate the overall prevalence for TNCPs with a sampling precision of at least $\pm 5\%$. However, it is possible that our study is no longer representative of all Airmen entering the US Air Force during this time period. Additionally, Airmen with missing TNCP data and thus excluded from analyses were more likely to be of Hispanic descent. As a result, our findings could be over or under-reporting the magnitude of TNCP use among minority Airmen in the Air Force. Estimates in Table 1 associated with non-Hispanic Asian Americans should be interpreted with caution due to the small cell. Finally, this is a cross sectional survey and future studies should document the changes in TNCP usage (and correlates of changes in TNCP use) over time, thereby documenting further the direct effect of the military environment on subsequent initiation of TNCP use.

In the current study we found high prevalence estimates of TNCP use across cohorts of Air Force Atrainees. In particular, high estimates of future intentions to use and low harm perception for emerging products such as hookah suggest that intervention efforts should be directed at multiple forms of TNCP use to address this important public health issue for this at risk population.

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Declaration of Interests

JOE is the only author with conflicts of interest to report. JOE reports grants from JHP Pharmaceuticals, Orexigen, and Pfizer outside the submitted work.

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